

# Electrical Equipment Safety

## Brief

Title:	Electrical Equipment Safety
Publication date:	12/16/2013
Effective date:	12/16/2013

## BRIEF

### Policy Summary

The Berkeley Lab Electrical Equipment Safety Program (EESP) is designed to ensure safe operation and installation of electrical utilization equipment. This is achieved by purchasing equipment with a Nationally Recognized Testing Laboratory (NRTL) certification, or through a Berkeley Lab inspection and approval process, with final approval by the Berkeley Lab Electrical Safety Authority Having Jurisdiction (AHJ).

### Who Should Read This Policy

Any Berkeley Lab employee, subcontractor, or affiliate who purchases or builds electrical utilization equipment for use at Berkeley Lab that has a potential of 50 volts or greater anywhere in the equipment

### To Read the Full Policy, Go To:

The POLICY tab on this wiki page

### To Read the ES&H Program Details, Go To:

<http://www.lbl.gov/ehs/pub3000/CH14.html>

### Contact Information

Electrical Safety Program Manager  
EHS Division / Electrical Safety Group

## Policy

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## POLICY

### A. Purpose

The Lawrence Berkeley National Laboratory (Berkeley Lab) Electrical Equipment Safety Program (EESP) is designed to ensure the safe

operation and installation of electrical utilization equipment. This is achieved by purchasing equipment with a Nationally Recognized Testing Laboratory (NRTL) certification, or through a Berkeley Lab inspection and approval process, with final approval by the Berkeley Lab Electrical Safety Authority Having Jurisdiction (AHJ).

## B. Persons Affected

Any Berkeley Lab employee, subcontractor, or affiliate who purchases or builds electrical utilization equipment for use at Berkeley Lab that has a potential of 50 volts or greater anywhere in the equipment

## C. Exceptions

The following types of electrical equipment do not require inspection and approval prior to use:

1. **Unmodified NRTL-Listed Equipment:** Equipment that is listed by an NRTL and has not been modified.
2. **Unused Equipment:** Equipment that is not being used, e.g., in storage, staged for salvage or excess, etc. Equipment that is not being used must be labeled with the EQUIPMENT OUT OF SERVICE label (see [Appendix B](#)) so it is clear it is not in use.
3. **Equipment Granted Conditional Acceptance Under Work Process E:** Prototype or proof-of-concept equipment (e.g., test chassis, benchtop experiment) in the process of being built to test the validity of a design and that is under the exclusive control of the designer if used for less than three months. Equipment being developed that exceeds a three-month period may be acceptable but requires Conditional Acceptance per [Work Process E](#).
4. **Equipment Considered Nonhazardous:** Equipment in any of the following categories is considered nonhazardous:

Type	Range Considered Non-Hazardous
60 Hz AC	<50 V
	>50 V and <5 mA

Note: Equipment that is connected to AC only via a step-down transformer/AC adapter with voltage output less than 50 volts is exempt, but the transformer/AC adapter must be NRTL Listed.

## D. Policy Statement

The Berkeley Lab Electrical Equipment Safety Program (EESP) is designed to ensure the safe operation and installation of electrical utilization equipment. Only electrical utilization equipment that has been approved by the AHJ may be used at Berkeley Lab. Electrical utilization equipment that has been Accepted, Certified, Labeled, or Listed by an NRTL is considered acceptable to the AHJ, and is approved for use provided the equipment is installed and used within the manufacturer's listing intent. Electrical utilization equipment that has NOT been Accepted, Certified, Labeled, or Listed by an NRTL is not acceptable to the AHJ unless it has satisfactorily passed a documented safety inspection. To meet this requirement, Berkeley Lab has established the EESP.

Upon installation, and prior to energization, newly purchased or Berkeley Lab–built electrical utilization equipment:

- Must receive an initial survey ([Work Process C, Equipment Surveys](#))
- That is not NRTL Listed must be inspected by an Electrical Equipment Inspector and approved by the AHJ ([Work Process D, Inspecting and Approving Electrical Equipment](#))

## E. Roles and Responsibilities

Role	Responsibilities
Engineering Division Director / AHJ	<ul style="list-style-type: none"> <li>• Collaborates with EHS Electrical Safety on standardizing acceptance criteria for equipment</li> <li>• Ensures that R&amp;D equipment fabricated and repaired by Engineering meets all relevant standards</li> <li>• Ensures that Engineering designs incorporate all required safety features</li> </ul>

EHS Electrical Safety Program Manager	<ul style="list-style-type: none"> <li>• Manages the Electrical Equipment Safety Program (EESP):</li> <li>• Establishes inspection criteria in accordance with appropriate electrical safety standards</li> <li>• Establishes and maintains the EESP database</li> <li>• Establishes training and qualification program for EESP inspectors and surveyors</li> <li>• Provides quality assurance to the inspection process</li> <li>• Provides Subject Matter Expert assistance where necessary to determine safety considerations</li> <li>• Maintains and supervises two full-time EESP inspectors</li> <li>• Oversees the EESP inspection process. Uses the EESP database to track equipment surveys and arrange inspections accordingly.</li> <li>• Coordinates the inspection of newly purchased equipment in a timely manner</li> <li>• Coordinates the inspection of legacy equipment</li> <li>• Promotes the program throughout the Laboratory</li> <li>• Performs technical assurance reviews as necessary</li> <li>• Maintains a list of reputable manufacturers</li> <li>• Coordinates with the Engineering Division AHJ to accept for use, with respect to electrical safety, electrical utilization equipment</li> </ul>
Berkeley Lab Electrical Safety Subcommittee (ESSC)	<ul style="list-style-type: none"> <li>• Advises on electrical safety matters and promotes electrical safety at Berkeley Lab. The ESSC will be a resource to aid in the development of inspection criteria, training, and program administration.</li> <li>• If a disagreement cannot be resolved by the Engineering Division AHJ and the EHS Electrical Safety Program Manager, the ESSC will hold a hearing to facilitate a resolution.</li> </ul>
Divisions	<ul style="list-style-type: none"> <li>• Procure equipment that is Listed as first consideration</li> <li>• Conduct surveys to identify and document Unlisted equipment within their organizations</li> <li>• Apply AHJ barcode labels to Unlisted equipment and enter the identification into the database</li> <li>• Notify the EESP of any new Unlisted equipment being purchased (<a href="mailto:EESP@lbl.gov">EESP@lbl.gov</a>)</li> <li>• Arrange for repairs and corrections to equipment in accordance with inspection findings</li> <li>• Remove from service equipment that has been labeled "AHJ FAIL"</li> <li>• Obtain EESP inspections for procured Unlisted equipment</li> </ul>
Equipment Supervisor	<ul style="list-style-type: none"> <li>• Also known as Responsible Person, or Equipment Owner</li> <li>• Cooperates with the EESP throughout the survey and inspection process</li> <li>• Ensures that all legacy electrical equipment has been identified and surveyed</li> <li>• Specifies for purchase only Listed equipment, if possible</li> <li>• Promptly notifies the EESP of any Unlisted equipment that has been ordered (<a href="mailto:EESP@lbl.gov">EESP@lbl.gov</a>)</li> <li>• Arranges survey and EESP inspection of procured Unlisted equipment before placement into service (<a href="mailto:EESP@lbl.gov">EESP@lbl.gov</a>)</li> <li>• Ensures that equipment is repaired and re-inspected as necessary</li> <li>• Complies with any conditions placed on equipment by an inspector</li> <li>• Arranges EESP inspection of new Berkeley Lab–built apparatuses before placement into service (<a href="mailto:ESP@lbl.gov">ESP@lbl.gov</a>)</li> <li>• Does not use Unlisted new equipment until it has been inspected and approved by an AHJ field representative</li> <li>• Does not use Unlisted legacy equipment unless it has been inspected and approved by an AHJ field representative</li> <li>• Removes from service any equipment found unsafe for use by an EESP field inspector</li> </ul>
Inspector	Qualified person designated by the AHJ to perform EESP inspections. Inspectors must complete training course EHS0383.
Procurement Department	Ensures that all written purchase orders and contracts include language requiring NRTL-Listed equipment

## F. Definitions/Acronyms

Term	Definition
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Approved	Acceptable to the Authority Having Jurisdiction (AHJ)
Acceptable	<p>Electrical utilization equipment is "acceptable" to the Berkeley Lab AHJ and approved if it is accepted, certified, listed, labeled, or otherwise determined to be safe by a Nationally Recognized Testing Laboratory (NRTL). If it is not determined to be safe by a Nationally Recognized Testing Laboratory (NRTL), it is acceptable if it is inspected or tested by another federal agency, or by a state, municipal, or other local authority responsible for enforcing occupational safety provisions of the National Electrical Code and found in compliance with the provisions of the National Electrical Code.</p> <p>Custom-made equipment or related installations that are designed, fabricated for, and intended for use by a particular customer is acceptable if it is determined to be safe for its intended use by its manufacturer on the basis of test data that the employer keeps and makes available for inspection to the Berkeley Lab AHJ and the AHJ's authorized representatives.</p>
Accepted	Electrical utilization equipment is "accepted" if it has been inspected and found by a Nationally Recognized Testing Laboratory (NRTL) to conform to specified plans or to procedures of applicable codes.
Authority Having Jurisdiction (AHJ)	<p>Generally, an organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure. At Berkeley Lab, the Electrical AHJ function is divided three ways:</p> <ol style="list-style-type: none"> <li>1. The AHJ for Electrical Safety work practices and workplace conditions is the EHS Electrical Safety Program Manager.</li> <li>2. The AHJ for research and scientific equipment is the Engineering Division Director.</li> <li>3. The AHJ for facilities and premises wiring is the Facilities Division Director.</li> </ol>
Certified	<p>Electrical utilization equipment is "certified" if it bears a label, tag, or other record of certification that the equipment:</p> <ul style="list-style-type: none"> <li>• Has been tested and found by a Nationally Recognized Testing Laboratory (NRTL) to meet nationally recognized standards or to be safe for use in a specified manner.</li> <li>• Is of a kind whose production is periodically inspected by a Nationally Recognized Testing Laboratory (NRTL) and is accepted by the laboratory as safe for its intended use.</li> </ul>
CE	<p><i>Conformité Européene:</i> This is a manufacturer's self-declaration of conformity to European design standards. It is not equivalent to an NRTL listing because:</p> <ul style="list-style-type: none"> <li>• There is no third-party verification of conformity through inspection or testing.</li> <li>• The standards are not recognized for applicability in the United States.</li> </ul>
Electrical Equipment Safety Program (EESP)	An inspection program designed to meet the OSHA requirement for AHJ acceptance of Unlisted electrical utilization equipment
Field evaluation	An electrical equipment safety inspection on Unlisted equipment performed on site by a Third-Party Field Evaluating Body (FEB)
Field Evaluating Body (FEB)	An organization that performs electrical equipment safety inspections and that is recognized by the AHJ. It is recognized by the AHJ if it meets the requirements of NFPA 790 and NFPA 791.
Inspection	An equipment electrical safety inspection performed on Unlisted equipment by an authorized EESP inspector
Legacy equipment	Electrical utilization equipment surveyed before October 1, 2013

Labeled	Electrical utilization equipment is "labeled" if there is attached to it a label, symbol, or other identifying mark of a Nationally Recognized Testing Laboratory (NRTL) that (1) makes periodic inspections of the production of such equipment and (2) whose labeling indicates compliance with nationally recognized standards or tests to determine safe use in a specified manner.
Listed (NRTL Listed)	Electrical utilization equipment is "Listed" if it is of a kind mentioned in a list that is published by a Nationally Recognized Testing Laboratory (NRTL) that (1) makes periodic inspection of the production of such equipment and (2) states that such equipment meets nationally recognized standards or has been tested and found safe for use in a specified manner.
Nationally Recognized Testing Laboratory (NRTL)	An organization that is recognized by OSHA and that tests for safety; or lists, labels, or accepts equipment based on established national standards. The NRTL is an independent third party and is not the manufacturer of the product or a government agency. A partial list of NRTL labels is provided in <a href="#">Appendix A</a> . The full list of NRTL labels can be found online at: {+} <a href="http://osha.gov/dts/otpca/nrtl/nrtlmrk.html">http://osha.gov/dts/otpca/nrtl/nrtlmrk.html</a> +
Reputable manufacturer	Manufacturers listed in <a href="#">Appendix D</a> are considered reputable and provide adequate technical support and technical documentation, and follow standard accepted safe designs even though they do not always obtain NRTL listing for their products.
Survey	The process of identifying and indexing Unlisted electrical utilization equipment that will later be inspected by a designated EESP Equipment Inspector.
Surveyor	Personnel identified by their division to conduct the NRTL survey for their organization are referred to as Electrical Equipment Surveyors. Before conducting the survey, Electrical Equipment Surveyors must complete training course EHS0381.
Unlisted	Electrical utilization equipment is "Unlisted" if it is not listed.
Utilization equipment	Equipment that utilizes electric energy for electronic, electromechanical, chemical, heating, lighting, or similar purposes

## G. Recordkeeping Requirements

Electrical utilization equipment surveys, inspections, status, and approvals are maintained on the EESP database.

## H. Implementing Documents

Document number	Title	Type
07.07.034.001	ES&H Manual <i>Electrical Equipment Safety</i>	Program
07.07.034.002	<a href="#">Work Process A. General Requirements</a>	Process
07.07.034.003	<a href="#">Work Process B. Procurement</a>	Process
07.07.034.004	<a href="#">Work Process C. Equipment Surveys</a>	Process
07.07.034.005	<a href="#">Work Process D. Risk Ranking</a>	Process
07.07.034.006	<a href="#">Work Process E. Conditional Acceptance Criteria</a>	Process
07.07.034.007	<a href="#">Work Process F. Inspecting and Approving Electrical Equipment</a>	Process
07.07.034.008	<a href="#">Work Process G. Repair, Salvage, and Out-of-Service Equipment</a>	Process
07.07.034.009	<a href="#">Work Process H. Training Requirements for EESP Surveyors and Inspectors</a>	Process

07.07.011.001	ES&H Manual <i>Electrical Safety</i>	Program
07.07.020.001	ES&H Manual <i>Lockout/Tagout Program</i>	Program

## I. Contact Information

Electrical Safety Program Manager  
EHSS Construction Safety Services

## J. Revision History

Date	Revision	By whom	Revision Description	Section(s) affected	Change Type
12/16/2013	0	M. Scott	New policy	All	Major

## Document Information

### DOCUMENT INFORMATION

Title:	Electrical Equipment Safety
Document number	07.07.034.000
Revision number	0
Publication date:	12/16/2013
Effective date:	12/16/2013
Next review date:	12/16/2016
Policy Area:	Industrial Hygiene and Safety
RPM Section (home)	ESH
RPM Section (cross-reference)	
Functional Division	EHS
Prior reference information (optional)	

## Source Requirements Documents

The 10 CFR 851 DOE Worker Safety and Health Program rule includes the following relevant standards by reference and must be complied with as law:

- Title 29 CFR, Part 1910, *Occupational Safety and Health Standards*. The relevant parts for this program are 1910.303(a) and 1910.399.
- National Fire Protection Association (NFPA) 70, *National Electrical Code*, (2005). The relevant articles for this program are 90.7, 110.2 and 110.3.

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07.07.034.002	<a href="#">Work Process A. <i>General Requirements</i></a>	Process
07.07.034.003	<a href="#">Work Process B. <i>Procurement</i></a>	Process
07.07.034.004	<a href="#">Work Process C. <i>Equipment Surveys</i></a>	Process
07.07.034.005	<a href="#">Work Process D. <i>Risk Ranking</i></a>	Process
07.07.034.006	<a href="#">Work Process E. <i>Conditional Acceptance Criteria</i></a>	Process
07.07.034.007	<a href="#">Work Process F. <i>Inspecting and Approving Electrical Equipment</i></a>	Process
07.07.034.008	<a href="#">Work Process G. <i>Repair, Salvage, and Out-of-Service Equipment</i></a>	Process
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